

12 **EUROPEAN PATENT APPLICATION**

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54 **Rolling mill.**

57 A triplet mill has a housing structure which defines a chamber, a pair of horizontal rolls and two pairs of vertical rolls contained within the chamber, each roll having a bearing chock assembly on each of its necks and one pair of vertical rolls disposed on each side of the pair of horizontal rolls and, in the direction parallel to the direction of movement of material through the mill, the chock assemblies of the vertical rolls are arranged to abut against the housing structure and the chock assemblies of the horizontal rolls are arranged to abut against the corresponding chocks of the vertical rolls.

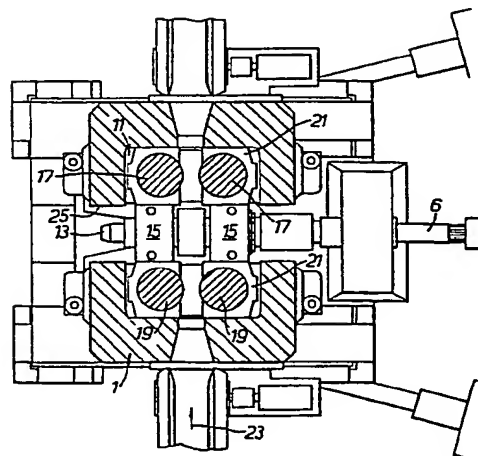


FIG. 3.

EP 0 052 467 A2

ROLLING MILL

This invention relates to a rolling mill of the type comprising a first set of vertical rolls, a set of horizontal rolls and a second set of vertical rolls, the sets of rolls being disposed very close together. A mill of that type is described and illustrated in British Patent Specification No.1390537 and will be referred to hereinafter as a "triplet mill".

According to the present invention, a triplet mill comprises a housing structure defining a chamber, a pair of horizontal rolls and two pairs of vertical rolls contained within the chamber with one pair of vertical rolls disposed on one side of the pair of horizontal rolls and the other pair of vertical rolls disposed on the opposite side of the pair of horizontal rolls and in the direction parallel to the direction of movement of material through the mill, the bearing chock assembly of each pair of vertical rolls abuts against the housing structure on one side and against the bearing chocks of the horizontal rolls on the other side.

With this construction, the rolls are held in close relation to each other. Vertical movement of the horizontal rolls to adjust the roll gap is permitted by the bearing chocks of the horizontal rolls sliding on the bearing chock assembly of each pair of vertical

rolls.

In one embodiment of the invention, each roll is rotatably mounted in a pair of bearing chocks and the bearing chocks of the horizontal rolls abut against the bearing chocks of the vertical rolls.

In an alternative embodiment, each roll is mounted in a pair of bearing chocks and the bearing chocks of each vertical roll of each pair of vertical rolls are arranged in a cassette having a pair of opposed side plates constituting part of the bearing chock assembly. It is the side plates which abut against the housing structure and the bearing chocks of the horizontal rolls.

The construction according to this invention enables roll changing to be carried out with relative ease.

In order that the invention may be more readily understood it will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a plan of a rolling mill in accordance with the invention,

Figure 2 is a sectional side elevation on the line C-C of Figure 1,

Figure 3 is a sectional plan on the line B-B of Figure 2, and

Figure 4 is a plan view of a roll arrangement according to an alternative embodiment of the

invention.

A triplet mill comprises a housing structure 1 containing a pair of horizontal rolls and two pairs of vertical rolls. The horizontal rolls are driven by a motor 3 through a pinion box 5 and a pair of drive spindles 6. Each pair of vertical rolls are driven from their lower end by means of a drive motor 7, a drive shaft 9 and a pinion box 10. However, in an alternative arrangement (not shown) the vertical rolls may be driven from their upper end.

As can be seen in more detail in Figure 3, the structure 1 defines a chamber 11 in which the rolls are located. Each of the horizontal rolls 13 is provided with bearing chocks 15 at its roll neck and each of the vertical rolls 17, 19 is provided with bearing chocks 21 at its roll neck. In the case of each pair of vertical rolls, the bearing chocks constitute a bearing chock assembly for the rolls. In the direction parallel to the direction of movement 23 of material through the mill, the bearing chocks 21 abut against the housing structure on one side and against the bearing chocks 15 on the other. The rolls of each pair of vertical rolls are movable horizontally towards and away from each other to vary the gap between them, and the horizontal rolls can be raised or lowered to adjust the gap between them. Wear plates provided on the bearing chocks permit the relative movement between the chocks to readily take place.

The housing structure defines an opening 25 through which the roll assemblies are displaced for roll changing purposes. The roll changing process is as follows:-

- (a) the horizontal rolls 13 and their bearing chocks 15 are displaced as a pair on a sledge 27 (see Figure 2) through the opening 25 on to a trolley 28 on guides 29 positioned on the roll change side of the mill,
- (b) the vertical rolls 17 and their bearing chocks 21 are moved to the centre of the housing structure and then displaced as a pair through the opening 25 on to the trolley 28,
- (c) the set of vertical rolls 19 and their bearing chocks 21 are moved to the centre of the housing structure and then displaced as a pair through the opening 25 on to the trolley 28,
- (d) replacement sets of vertical rolls are displaced in turn from the trolley 28 into the respective places in the housing structure and, finally,
- (e) the replacement horizontal rolls are displaced from the trolley into the mill structure.

Between each movement of the rolls, the trolley supported on the guides 29 is displaced by one step along the guides, thus enabling worn rolls to be positioned on the trolley and replacement rolls to be displaced from the trolley into the mill.

In an alternative roll arrangement, each pair of vertical rolls and their bearing chocks are located within a cassette which forms part of the bearing chock assembly for the pair of rolls.

Referring to Figure 4, the vertical rolls 19 are supported in bearing chocks 21 and the rolls are positioned between a pair of parallel plates 30 joined together by straps 31 to form a cassette. The bearing chocks 21 rest on the plates 30.

The bearing chocks and the cassette constitute a bearing chock assembly for the two vertical rolls 19.

Similarly, the rolls 17 are supported in bearing chocks 21 and the rolls are positioned in a cassette formed by parallel plates 30 joined together by straps 31. The bearing chocks and the cassette constitute a bearing chock assembly for the two vertical rolls 17. In this embodiment of the invention, the bearing chock assembly of each pair of vertical rolls abuts against the housing on one side and against the bearing chocks of the horizontal rolls on the other side.

An opening 32 in each of the parallel plates 30 enables the workpiece to be passed between the rolls.

Claims:

1. A triplet mill comprising a housing structure defining a chamber, a pair of horizontal rolls and two pairs of vertical rolls contained within the chamber with one pair of vertical rolls disposed on one side of the pair of horizontal rolls and the other pair of vertical rolls disposed on the opposite side of the pair of horizontal rolls and in the direction parallel to the direction of movement of material through the mill, the bearing chock assembly of each pair of vertical rolls abuts against the housing structure on one side and against the bearing chocks of the horizontal rolls on the other side.

2. A triplet mill as claimed in claim 1, in which each vertical roll is rotatable in a pair of bearing chocks and each pair of vertical rolls are contained within a cassette which forms parts of the bearing chock assembly of that pair of vertical rolls.

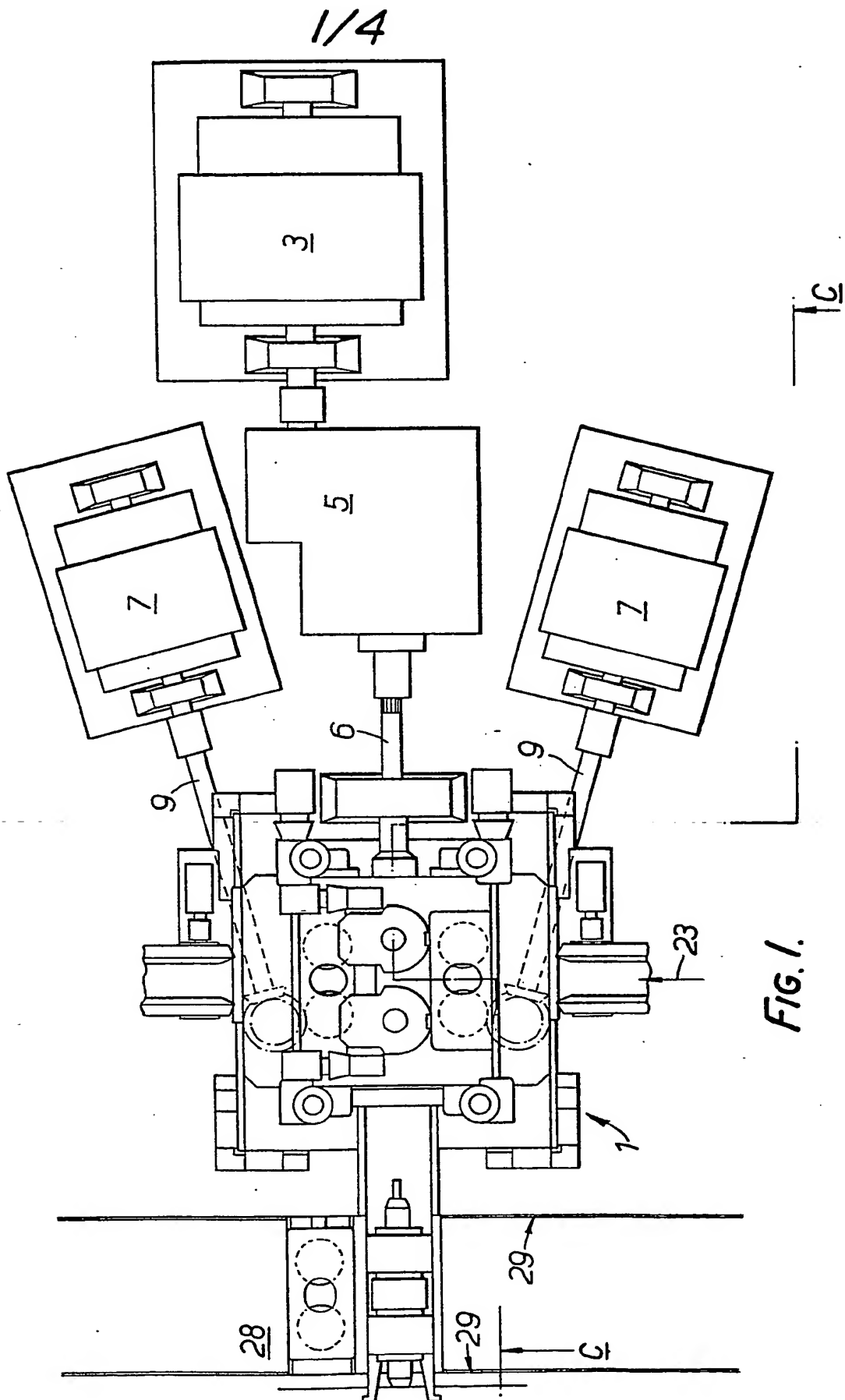
3. A triplet mill as claimed in claim 1, in which the vertical rolls are driven at their lower ends.

4. A triplet mill as claimed in claim 1 or 2, in which the housing structure defines an opening leading from the chamber to the exterior of the mill, said

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opening being of sufficient size to permit the rolls to
pass one-pair-at-a-time therethrough.



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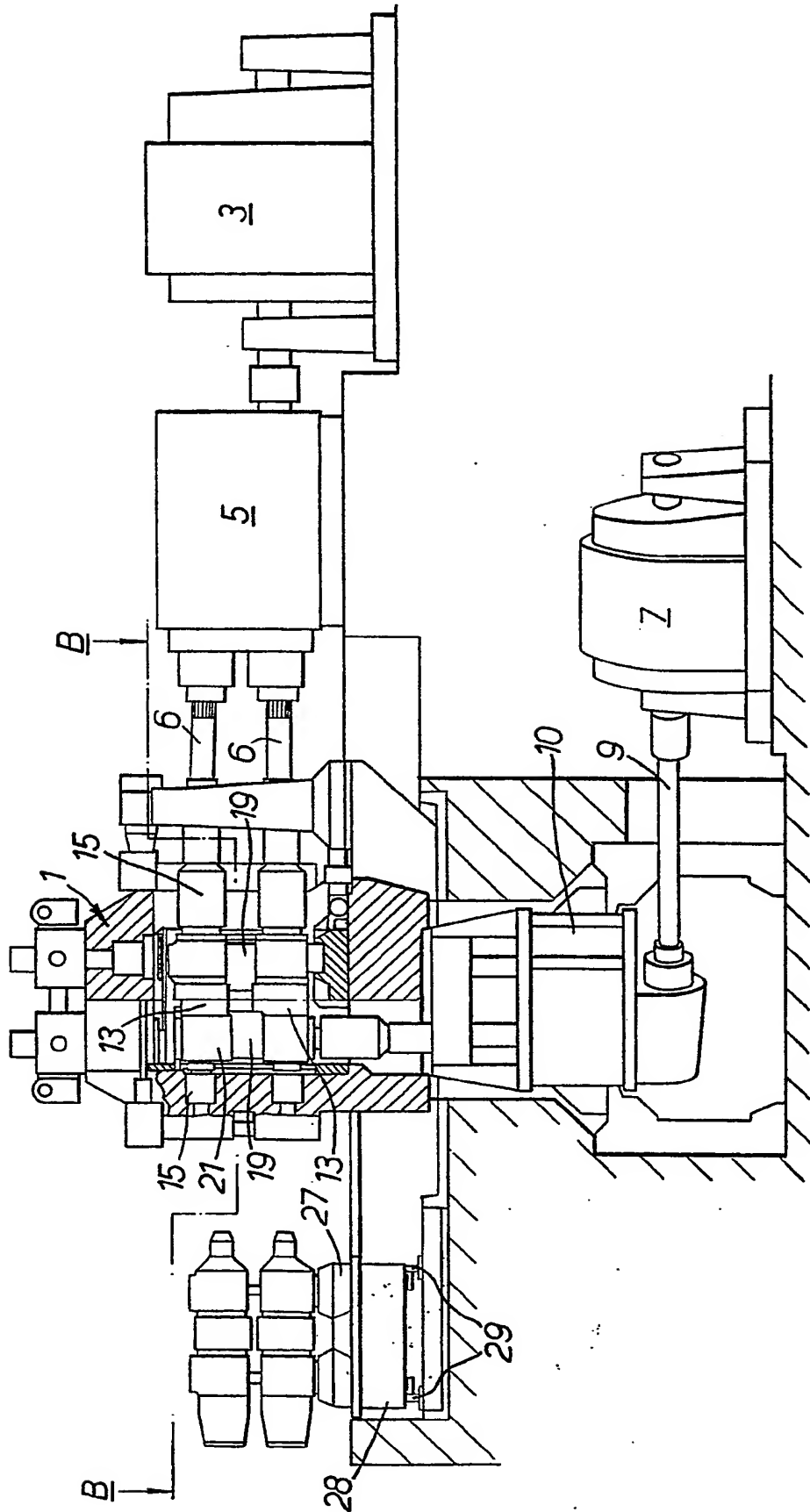


FIG. 2.

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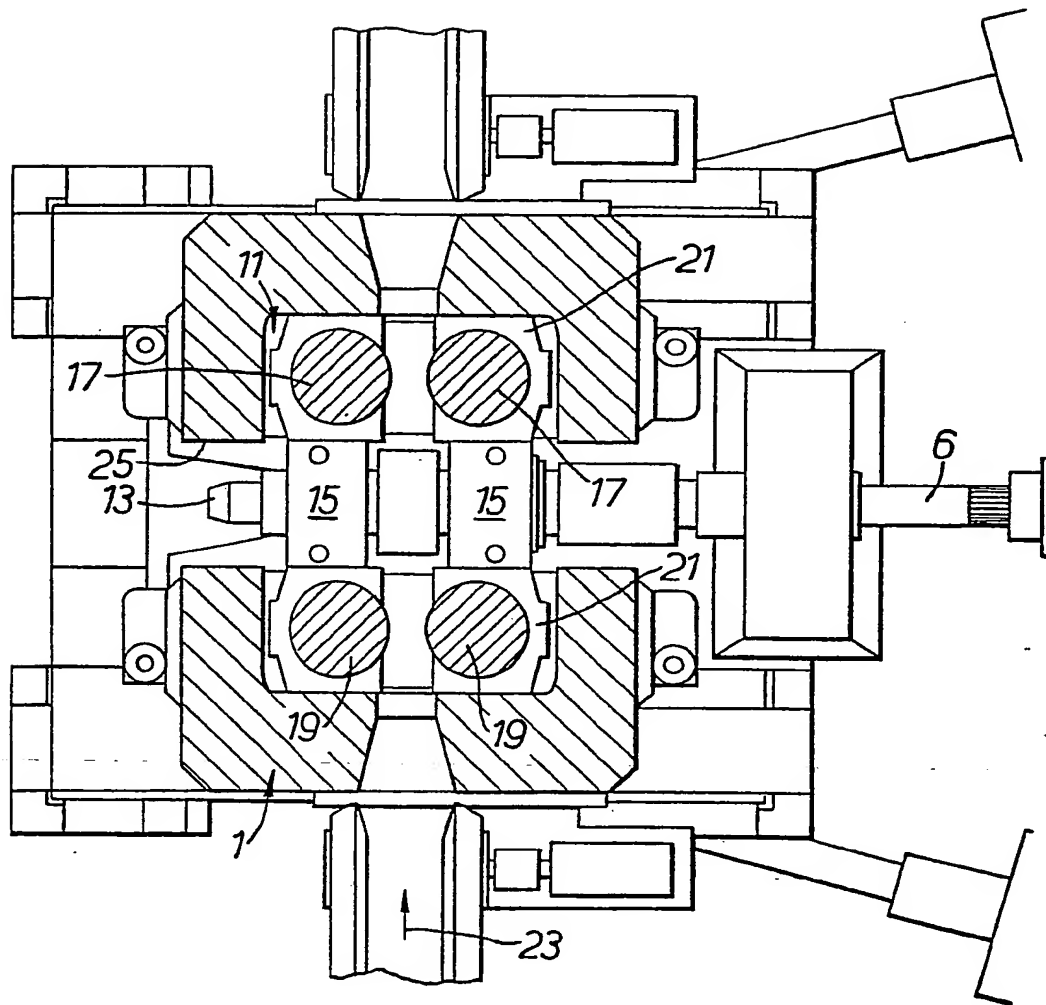


Fig. 3.

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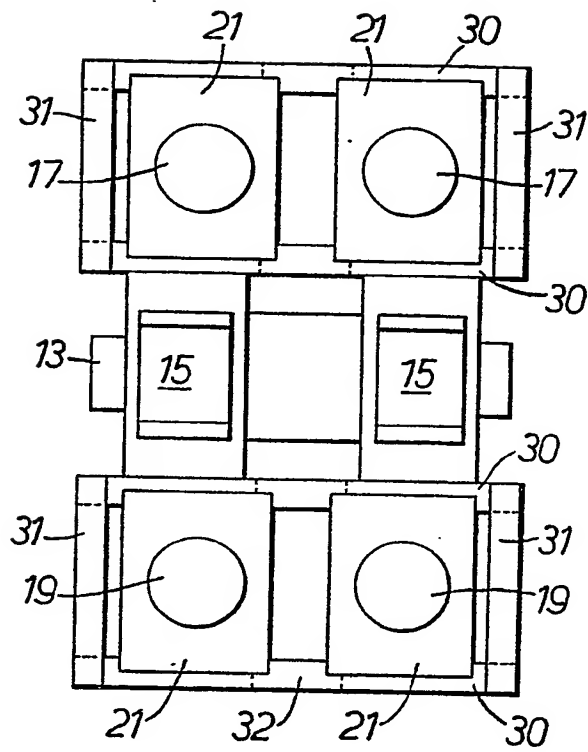


FIG. 4.

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54 Rolling mill.

57 A triplet mill has a housing structure (1) which defines a chamber (11), a pair of horizontal rolls (13) and two pairs of vertical rolls (17,19) contained within the chamber, each roll having a bearing chock (15,21) assembly on each of its necks and one pair of vertical rolls disposed on each side of the pair of horizontal rolls and, in the direction parallel to the direction of movement (23) of material through the mill, the chock assemblies of the vertical rolls are arranged to abut against the housing structure and the chock assemblies of the horizontal rolls are arranged to abut against the corresponding chocks of the vertical rolls.

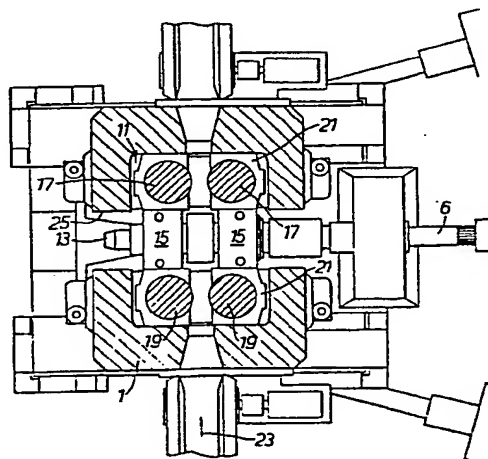


FIG. 3.

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European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 81 30 5287.5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	GB - A - 947 007 (SCHLOEMANN AG) * claims 1 to 3; fig. 4 *	1,3,4	B 21 B 13/12 B 21 B 1/04
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D,Y	GB - A - 1 390 537 (AB METALFORM) * claim 1; fig. 3 *	1,2	
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Y	Patent Abstracts of Japan Vol. 4, No. 147, 16 October 1980 page 113M36 & JP - A - 55 - 100807	1,2	
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Y	GB - A - 1 033 481 (CONTUBIND SA) * claim 1; fig. 4 *	1	B 21 B 1/00 B 21 B 13/00 B 21 B 31/00
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A	GB - A - 1 424 313 (AB METALFORM)		
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A	GB - A - 1 422 723 (USS ENGINEERS)		

			TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons
The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 23-03-1982	Examiner SCHLAITZ